CLAIMS

1. The method for the preparation of a cutting tool insert comprising the steps of

- milling and mixing powders of alumina and silicon carbide whiskers;
- forming said mixture into a preformed workpiece;
- heating said workpiece at a heating rate of from about 20 to about 60°C per minute to a sintering temperature of between from about 1600 to about 2300°C; and
- holding said workpiece at said sintering temperature for a holding time of from about 5 to about 60 minutes at a pressure of between 20 to 100 MPa.

2. The method of claim 1 wherein said heating said workpiece is done by applying electrical energy in the form of a DC current that at least partially goes through said workpiece.

3. The method of claim 2 wherein said DC current is unpulsed.

4. The method of claim 2 wherein said DC current is pulsed.

5. The method of claim 1 comprising

- providing a bed comprising a bed material of electrically conductive, flowable particles within a contained zone,
- placing the preformed workpiece in said bed,
- applying a pressure to said bed, and
- heating up said workpiece by applying electrical energy to said electrically conductive, flowable particles within said heating rate.

6. The method of claim 5 wherein the bed material of electrically conductive, flowable particles comprises graphite.

7. The method of claim 6 wherein the bed material comprises spherical graphite or carbided graphitic material.

8. The method of claim 1 wherein said sintering temperature is between from about 1800 to about 2100°C.

9. The method of claim 8 wherein said sintering temperature is between from about 1900 to about 2000°C.

10. The method of claim 10 wherein said heating rate is from about 20 to about 40°C per minute.

11. The method of claim 10 wherein said heating rate is from about 25°C per minute.

12. The method of claim 1 wherein said holding time is from about 5 to about 30 minutes.

13. The method of claim 12 wherein said holding time is from about 10 to about 20 minutes.

14. The method of claim 13 wherein said holding time is from about 15 minutes.

15. The method of claim 1 wherein said pressure is from about 30 to about 100 MPa.

16. The method of claim 15 wherein said pressure is from about 40 to about 100 MPa.

17. The method of claim 1 wherein said composite material comprises alumina plus silicon carbide whiskers in a total proportion of at least 90 percent by volume.

18. The method of claim 16 wherein said composite material comprises alumina plus silicon carbide whiskers in a total proportion of at least 95 percent by volume.

19. The method of claim 1 wherein said composite material comprises silicon carbide whiskers in a proportion of from about 5 to about 70 percent by volume.

20. The method of claim 19 wherein said composite material comprises silicon carbide whiskers in a proportion of from about 15 to about 50 percent by volume.

21. The method of claim 20 wherein said composite material comprises silicon carbide whiskers in a proportion of from about 20 to about 45 percent by volume.

22. The method of claim 1 wherein said alumina in said composite material has mean diameter of less than 2.0 μm.

23. The method of claim 22 wherein said alumina in said composite material has mean diameter of less than 1.5 μm.

24. The method of claim 23 wherein said alumina in said composite material has mean diameter of less than 1.0 μm.

25. The method of claim 24 wherein said alumina in said composite material has mean diameter of less than 0.9 μm.

26. The method of claim 1 wherein said alumina in said composite material has a 80^{th} percentile (P80) of less than 2.5 μm.

27. The method of claim 26 wherein said alumina in said composite material has a 80^{th} percentile (P80) of less than 2.0 μm.

28. The method of claim 27 wherein said alumina in said composite material has a 80th percentile (P80) of less than 1.8 μm.

29. The method of claim 28 wherein said alumina in said composite material has a 80th percentile (P80) of less than 1.3 μm.

30. The method of claim 1 wherein said composite material additionally comprises magnesia and/or yttria in a proportion of from about 0.01 to about 5 percent by weight.

31. The method of claim 30 wherein said composite material additionally comprises magnesia and/or yttria in a proportion of from about 0.02 to about 1 percent by weight.

32. The method of claim 31 wherein said composite material additionally comprises magnesia and/or yttria in a proportion of from about 0.03 to about 0.5 percent by weight.

33. A cutting tool insert having a sintered alumina and silicon carbide whisker composite material body, being prepared according to the process of claim 1.

34. The cutting tool insert of claim 33, wherein said alumina in said composite material has a mean diameter of less than 2.0 μm.

35. The cutting tool insert of claim 34, wherein said alumina in said composite material has a mean diameter of less than 1.5 μm.

36. The cutting tool insert of claim 35, wherein said alumina in said composite material has a mean diameter of less than 1.0 μm.

37. The cutting tool insert of claim 36, wherein said alumina in said composite material has a mean diameter of less than 0.9 μm.

38. The cutting tool insert of claim 34, wherein said alumina in said composite material has a 80th percentile (P80) of less than 2.5 μm.

39. The cutting tool insert of claim 38, wherein said alumina in said composite material has a 80th percentile (P80) of less than 2.0 μm.

40. The cutting tool insert of claim 39, wherein said alumina in said composite material has a 80th percentile (P80) of less than 1.8 μm.

41. The cutting tool insert of claim 40, wherein said alumina in said composite material has a 80th percentile (P80) of less than 1.3 μm.